



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/754,549 | 01/12/2004 | Torben Baras | 29250-001094/US | 9256 |

7590 02/20/2007
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 8910
Reston, VA 20195

| |
|----------|
| EXAMINER |
|----------|

DSOUZA, JOSEPH FRANCIS A

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2611

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 02/20/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/754,549

Applicant(s)

BARAS ET AL.

Examiner

Adolf DSouza

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/7/2005.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Modulation and transmission apparatus/method for a wireless link"

Claim Objections

2. Claim 9 is objected to because of the following informalities: The preamble states "step of forming" which refers to the forming the input signal, as stated in claim 8. However, the body of claim 9 does not deal with forming the input signal but processing it after it has been formed.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 16 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 16 and 17, claims 16 and 17 are apparatus claims that dependent on independent claims 1 and 8, which are method claims. This makes them hybrid claims.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 – 8, 10 – 14, 16 - 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Pleasant et al. (US 20020175776) (which has been provided by the Applicant in his IDS).

Regarding claim 1, Pleasant discloses a method of modulating an input signal (Fig. 2, I and Q inputs to modulator 146-1 and 146-2; page 2, paragraph 27, 29; wherein the input signal is the I and Q signal) to obtain a desired intermediate signal (Fig. 2, phase modulator 116 output; page 3, paragraph 30; wherein the intermediate signal is the output of modulator 116 in the range 10 – 13 GHz) that is to be subject to processing for transmission over a wireless link (page 2, paragraph 22, 1st 2 lines) at a carrier frequency within a desired frequency band (page 3, paragraph 30; wherein the desired frequency band is the 48 – 52 GHz band), the processing including subjecting the desired intermediate signal to a frequency multiplier operation that exhibits an ambiguous transfer function (Fig. 2, elements 118 or 126; page 2, paragraph 26; page

Art Unit: 2611

3, paragraphs 34 – 36; wherein the ambiguity is a property of frequency multiplication), the method comprising:

providing an input signal for modulation (Fig. 2, I and Q inputs to modulator 146-1 and 146-2; page 2, paragraph 27, 29; wherein the input signal is the I and Q signal);

generating a set of signal states applicable to the desired intermediate signal so that a carrier signal resulting from the processing has a substantially non-ambiguous relation to the desired intermediate signal (page 3, paragraphs 34 – 36; wherein the non-ambiguity is obtained, for example, by having the inputs phase shifts at 9, 22.5, 45, 67.5 to obtain output phase shifts at 0, 90, 180, 270 degrees with a x4 frequency multiplier);

and modulating the input signal according to I and Q baseband signals to obtain the desired intermediate signal with the generated set of signal states (Fig. 2, element 144, 146-1, 146-2; page 2, paragraph 26).

Regarding claim 2, Pleasant discloses the desired frequency band encompasses a spectrum of frequencies in the 71-76 GHz, 81-86 GHz and 92-95 GHz bands (paragraph 5, last 3 lines; paragraph 24; wherein the spectrum stated above is a subset of the unallocated frequencies from 40 – 320 GHz).

Regarding claim 3, Pleasant discloses step of generating includes mapping signal states of a first modulation scheme onto at least a portion of states of a plurality of

available signal states for a second, higher-order modulation scheme to provide I and Q modulation signal inputs to the modulating step (paragraphs 34 – 36; wherein the first modulation scheme are the phase values used before the frequency multiplication and the second modulation scheme is the symbols obtained after the frequency multiplication with the second modulation scheme having more states).

Regarding claim 4, Pleasant discloses modulating further includes modulating the input signal in quadrature (Fig. 2, I and Q inputs to 146-1 and 146-2; wherein the quadrature modulation are the I and Q symbols being modulated).

Regarding claim 5, Pleasant discloses modulating the input signal in phase and amplitude (paragraphs 5, 35; wherein the amplitude modulation is that of the PSK scheme, which is constant amplitude and the phase modulation is that of the input angles 0, 22.5, 45, 67.5 shown in paragraph 35).

Regarding claim 6, Pleasant discloses the input signal is a sinusoidal signal (Fig. 2, element 144; paragraphs 27, 30, 40; wherein the sinusoidal signal comes from the local oscillator 144).

Regarding claim 7, Pleasant discloses the signal to be transmitted has a substantially non-ambiguous relation to the desired intermediate signal as evident by signal states of the signal to be transmitted, which is output from the frequency multiplier, substantially corresponding to signal states of the desired intermediate signal, which is input to the frequency multiplier ((paragraphs 34 – 36).

Claim 8 discloses substantially similar limitations to those in claims 1 and 6 and is therefore similarly rejected as claims 1 and 6 above.

Claims 10, 11, 12, 13 and 14 are similarly rejected as claims 2, 3, 4 & 6, 5 & 6 and 7 respectively.

Claims 16 – 18 are similarly analyzed as claim 2.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pleasant et al. (US 20020175776) in view of Kool et al. (US 5,903,609) (which has been provided by the Applicant in his IDS).

Regarding claim 9, Pleasant doesn't disclose up converting the modulated baseband signal to IF, filtering the IF signal and amplifying the IF signal.

In the same field of endeavor, however, Kool discloses up converting the modulated baseband signal to an intermediate frequency (IF) signal (Fig. 1, elements 4, 12; column 3, lines 54 - 67);

filtering the IF signal to remove out-of-band components (Fig. 1, element 14; column 3, lines 54 - 67);

amplifying the filtered IF signal to a desired signal level to provide the input signal (Fig. 1, element 16; column 3, lines 54 - 67).

Therefore it would have been obvious to one having ordinary skill in the art, at the time the invention was made, to use the method, as taught by Kool, in the system of Pleasant because this would allow the baseband signal to be up converted to RF and transmitted, as is well known in the art.

Regarding claim 15, Pleasant discloses a transmitter circuit for transmitting data over a wireless link (page 2, paragraph 22, 1st 2 lines) at a carrier frequency within a desired frequency band (page 3, paragraph 30; wherein the desired frequency band is the 48 – 52 GHz band), comprising:

at least one frequency synthesizer for inputting a sinusoidal signal for modulation (Fig. 2, element 144, 146-1, 146-2; page 2, paragraph 26);

a digital processor for generating a set of signal states applicable to a desired modulated baseband signal (Fig. 2, element 141; Fig. 2, I and Q inputs to modulator 146-1 and 146-2; page 2, paragraph 27, 29; wherein the input signal is the I and Q signal);

at least one modulator for modulating the sinusoidal signal according to I and Q baseband signals to obtain the desired modulated baseband signal with the generated set of signal states (Fig. 2, I and Q inputs to modulator 146-1 and 146-2; page 2, paragraph 27, 29; wherein the input signal is the I and Q signal);

a frequency multiplier for subjecting the input signal to a frequency multiplier operation characterized by an ambiguous transfer function, so as to produce an output signal at the carrier frequency that has a substantially non-ambiguous relation to the input signal (Fig. 2, element 118 or 126; page 3, paragraphs 34 – 36; wherein the non-ambiguity is obtained, for example, by having the inputs phase shifts at 9, 22.5, 45, 67.5 to obtain output phase shifts at 0, 90, 180, 270 degrees with a x4 frequency multiplier);

and an antenna for transmitting the output signal at the carrier frequency within the desired frequency band over the wireless link (Fig. 2, element 132).

All other elements (i.e. mixer, filter, amplifier) of claim 15 are similarly analyzed as in claim 9 above.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

The following patents are cited to further show the state of the art with respect to PSK modulation systems and frequency multipliers:

Woodworth et al. (US 4,876,737) discloses a satellite data transmission and receiving station using frequency multipliers.

Jacobsmeier (US 5,974,038) discloses an adaptive data rate modem.

Osborne (US 4,048,563) discloses a carrier -modulated coherency monitoring system.

O'Toole et al. (US 6,466,634) discloses Radio frequency data communications device.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



AD

Adolf DSouza
Examiner
Art Unit 2611



DAVID C. PAYNE
PRIMARY PATENT EXAMINER